

SOROKIN, M.F.; KHINCHINA, E.L.

Synthesis of allyl glycidyl ester and butyl methacrylate copolymers.
Lakokras. mat. 1 ~~14~~ prim. no.4:5-10 '63. (MIRA 16:10)

SOROKIN, M.F.; KOCHNOV, I.M.

Synthesis of glycidyl methacrylate and styrene copolymers in solvents and their use as a base for the manufacture of protective coatings. Lakokras. mat. i ikh prim. no.4:10-15 '63.

SOROKIN, M.F.; MIKHAYLOVA, L.S.

Polymerization of aryl glycidol esters in the presence of metal
halides. Lakokras. mat. i ikh prim. no.5:10-15 '63.

(MIRA 16:11)

L 9839-63
RM/WW/MAY

EPR/EWP(j)/EPF(c)/EWT(m)/BDS--AFFTC/ASD--PS-l/Pc-l/Pr-l---

ACCESSION NR: AP3000395

S/0191/63/000/005/0011/0014

AUTHOR: Sorokin, M. F.; Latov, V. K.; Korkishko, Zh. T.; Kochnova, Z. A. 73

TITLE: Copolymers of unsaturated ethers of glycidol. Copolymerization of methyl methacrylate with allylglycidyl ethers in solutions

SOURCE: Plasticheskiye massy*, no. 5, 1963, 11-14

TOPIC TAGS: copolymerization, methyl methacrylate, 2-propenyl 2,3-epoxypropyl, copolymerization rate, reaction temperature, initiator concentration, reactivity ratios, yields, molecular weight, benzoyl peroxide

ABSTRACT: Methyl methacrylate (MMA) and 2-propenyl 2,3-epoxypropyl ether (PEPE) have been copolymerized in methyl ethyl ketone, dioxane, or toluene solution at 70 to 90C in the presence of 0.5 to 1.0 mol% of benzoyl peroxide or Alpha,Alpha-azobisisobutyronitrile. The reaction was conducted under nitrogen in solutions whose initial concentration of the monomers was 30%, with MMA and PEPE in ratios of 2:1, 1:1, and 1:2. The copolymerization rate dropped with an increase in the PEPE content and increased with an increase

Card 1/2

L 9839-63

ACCESSION NR: AP3000395

0

in the reaction temperature or initiator concentration. Because MMA is much more reactive than PEPE, the MMA-PEPE ratio in the copolymers is much higher than that in the initial monomer mixture. The monomer reactivity ratios were calculated to be 40.7 for MMA and 0.035 for PEPE. The copolymers, obtained in yields of 41 to 86%, are white solids readily soluble in benzene, toluene, acetone, or dioxane. Their molecular weights vary from 2000 to 10,000, decreasing with an increase in the initial PEPE concentration, reaction temperature, or initiator concentration. Copolymers prepared in dioxane solution have the highest molecular weight. Orig. art. has: 5 figures and 4 tables.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 10Jun63

ENCL: 00

SUB CODE: 00

NO REF SOV: 000

OTHER: 011

ja/ss

Card 2/2

BR

8/0303/64/000/002/0007/0010

ACCESSION NR: AP4034711

AUTHORS: Sorokin, M. F.; Kochneva, Z. A.; Korkishko, Zh. T.

TITLE: Two-component polyurethane lacquers on the base of glycidyl ester polymers, synthesized in the presence of two- and three-functional initiators

SOURCE: Lakokrasochnyye materialy* i ikh primeneniye, no. 2, 1964, 7-10

TOPIC TAGS: polyurethane lacquer, glycidyl ester, phenylglycidyl ester, butylglycidyl ester, glycidyl ester polymer, diisocyanate, triisocyanate, chemical film stability, lacquer film hardening, lacquer film adhesion

ABSTRACT: The base n-butylglycidyl ester polymer (BGEP) and the phenylglycidyl ester polymer (PGEP) were synthesized from the corresponding monomers by block polymerization at 90C in the presence of the initiators resorcinol, trimethylolpropane, and NaOH. While 30% resorcinol yielded linear polymers of an average molecular weight of 570, the same amount of trimethylolpropane produced branched polymers of molecular weights within the 760-775 range. The BGEP and PGEP polymers so produced were used to make lacquers by being blended with toluenediisocyanate (TD), with 4,4'-diphenylmethanediisocyanate (DMD), or with 4,4',4"-triphenylmethanediisocyanate (TMD). Since the hardening of films of such two-

Card 1/2

ACCESSION NR: AP4034711

component compositions is caused by the formation of urethanes, the authors performed a series of tests, using various NCO:OH ratios, temperatures, and reaction periods. It was found that at 90C satisfactorily hardened films with high physico-mechanical properties and good appearance were obtained by blending the glycidyl esters of linear structure with TMD, and by blending the polymers of branched structure with TD or DMD. It was also found that for blends of the linear PGE polymer with TMD the optimum ratio of NCO:OH was 1.3:1. This yielded (at 90C) a completely hardened film within 6-7 hours. For the branched BGE and PGE polymers, the optimal ratios of NCO:OH in their blends with DMD were 1.4:1 and 1.1:1, and the hardening periods were 1 and 3 hours respectively. A period of 16-20 hours was required for hardening films of the branched BGE polymer blended with TD at a NCO:OH ratio of 1.4:1. The hardness, adhesion, and resistance to chemical agents of the lacquer films proved them to be of high quality. O. A. Vasil'yeva participated in the work. Orig. art. has: 4 charts, 3 tables, and 3 formulas.

ASSOCIATION: none

SUBMITTED: 00

SUB CODE: MT

DATE ACQ: 20May64

NO REF SOV: 004

ENCL: 00

OTHER: 006

Card 2/2

ACCESSION NR: AP4040513

S/0303/64/000/003/0008/0010

AUTHOR: Zlobina, V. R.; Sorokin, M. F.; Elagonravova, A. A.

TITLE: Curing of epoxide resins

SOURCE: Lakokrasochnyye materialy* 1 ikh primeneniye, no. 3, 1964, 8-10

TOPIC TAGS: epoxide resin, phenyl glycidyl ether, carbanilide, epoxy group, imino group epoxide resin curing

ABSTRACT: It was established that phenyl glycidyl ether reacts with carbanilide to form hydroxyl-containing compounds as a result of the interaction between epoxy and imino groups; it was postulated that in addition, a reaction is possible between the epoxy groups and the hydroxyl groups formed. It was shown that condensation of butyl ether takes place in the course of the reaction of phenyl glycidyl ether with dibutyl ester of dimethylolurea, simultaneously with the interaction of the epoxy and imino groups, and with the interaction of the hydroxyl groups formed and the epoxy groups. This condensation is indicated by the evolution of butanol in the course of the reaction.

ASSOCIATION: none

Card 1/2

ACCESSION NR: AP4043819

S/0303/64/000/004/0001/0004

AUTHOR: Sorokin, M. F. ; Kochnova, Z. A. ; Korkishko, Zh. T. ; Vasil'yeva, O. A.

TITLE: Premixed polyurethan coatings based on polymers of n-butyl- and phenylglycidyl ethers.

SOURCE: Lakokrasochny*ye materialy* i ikh primeneniye, no. 4, 1964. 1-4

TOPIC TAGS: premixed coating, prepolymer synthesis, cured film, chemically resistant coating, polymerized phenylglycidyl ether, polymerized n-butyl ether, toluylene diisocyanate, polyurethan, polyurethan film

ABSTRACT: Two types of prepolymers with isocyanate end groups were synthesized from linear or branched polymers of n-butyl or phenylglycidyl ethers and toluylene diisocyanate, using 30 mol. % trimethylolpropane or phenylglycidyl or resorcinol as initiators, respectively, to obtain premixed polyurethan coatings characterized by stability in storage. Two type-1 prepolymers were synthesized from the branched polymers at 60C. Both the polymer and the diisocyanate were used as 50% solutions in xylene, the temperature of the exothermic reaction did not exceed 20C, and the reaction was complete 1.5 hrs. after toluylene diisocyanate was added. Two type-2 prepolymers were synthesized at 70C from

Card 1/2

SOROKIN, M.F.; MIKHAYLOVA, L.S.

Polymerization of phenyl glycidyl ether in the presence of
aluminum isopropylate and zinc chloride. Vysokom.soc. 6
no.4:677-683 Ap '64. (MIRA 17:6)

1. Moskovskiy khimiko-tekhnologicheskii institut imeni
D.I. Mendeleyeva.

L 16038-65 EWT(m)/EWP(j)/T Pc-4 RM

ACCESSION NR: AP4047671

S/0303/64/000/005/0001/0005

AUTHOR: Sorokin, M. F. , Korkishko, Zh. T., Kochnova, Z.A.

TITLE: Two-component polyurethan varnishes based on nitrogenous tetrafunctional polymers of glycidyl ethers and polyisocyanates

SOURCE: Lakokrasochny*ye materialy* i ikh primeneniye, no. 5, 1964, 1-5

TOPIC TAGS: lacquer, polyurethane varnish, nitrogenous polymer, tetrafunctional polymer, glycidyl ether, polyisocyanate, tolylene diisocyanate, hexamethylene diisocyanate, hexamethylene diamine, ethylene diamine, tolylene diamine, polymer hardening, polymerization initiator

ABSTRACT: Tetrafunctional nitrogen-containing polymers based on glycidyl ethers were synthesized and were shown to be of possible use for obtaining two-component polyurethan compositions with tolylene and hexamethylene diisocyanate. The polymers were synthesized in the presence of tetrafunctional initiators such as hexamethylene diamine, ethylene diamine and m-tolylene diamine. It was found that the addition of a small amount of sodium hydroxide (5 mol. %) accelerates the process at a molar ratio of 7:1 of ether to diamine. The structural formulas of the polymers are given. The characteristics of the polymers and copolymers synthesized in the presence of diamines and a catalyst (5 mol. % NaOH) are

Card 1/2

L 16038-65

ACCESSION NR: AP4047671

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tabulated. Formulas are given for calculating the number, average mol. weight and the average degree of polymerization from the nitrogen and hydroxyl group content. The optimal conditions of hardening of lacquer films and optimal NCO:OH ratios in the composition were investigated, and it was found that the rate of hardening decreases with increasing degree of polymerization. The relationship between the hardening of films and the average degree of polymerization and hardening temperature shows that by heating for 3 hours at 100C a 98 - 100% hardening is obtained for all lacquer coatings. At 90C the rate of hardening varies considerably in relation to the structure of the polymer, especially in the first hour of hardening. The coatings containing tetrafunctional polymers have a high gloss and hardness and excellent adhesion. The physico-mechanical properties and chemical stability are tabulated. All polyurethan coatings have good chemical stability. Orig. art. has: 5 figures and 4 tables.

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: MT, OC

NO REF SOV: 005

OTHER: 002

Card 2/2

L 29997-65 EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4 WW/RM
ACCESSION NR: AP4047676 S/0303/64/000/005/0015/0019

AUTHOR: Sorokin, M.F.; Khinchina, E.L.

TITLE: The synthesis of linear polyesters from monoepoxide compounds and dicarboxylic acids

SOURCE: Lakokrasochny*ye materialy* i ikh primeneniye, no. 5, 1964, 15-19

TOPIC TAGS: polyesterification, linear polyester, monoepoxide, dicarboxylic acid, molecular weight distribution, turbidimetric titration, adipic acid, glycidol ester, two stage synthesis, polydispersity

ABSTRACT: A new type of linear polyesters was synthesized from dicarboxylic acids and monoepoxide compounds without catalysts. The resulting resins were very soluble in aromatic hydrocarbons, ketones, acetates, chlorinated hydrocarbons and dioxane. The synthesized polyesters were analyzed for acid and hydroxyl numbers, reduced viscosity, molecular weight (by the methods of differential ebulliometry, cryoscopy, and terminal carboxyl and hydroxyl group determinations), and molecular weight distribution (by turbidimetric titration). The polyester synthesis process can be divided into two stages; the formation of acidic monoesters and the formation of diesters. A series of experiments was run with different initial concentrations of adipic acid and glycidol esters to determine

Card 1/2

L 29997-65

ACCESSION NR: AP4047676

the overall sequence of the synthesis stages. It was established that the speed constants are fixed and do not depend on the ratio of the original components, and that the speed of polyesterification increases with an increase of glycidol esters in the reaction mixture. The use of catalysts accelerates only the first stage of the synthesis. The properties of polyesters synthesized at a 1:1 ratio of the original components are presented. The effects of the types of epoxy compounds and dicarboxylic acids on the degree of conversion and molecular weight distribution of the polyester are shown. The molar ratio of the initial components and the temperature of the second stage of synthesis are analyzed for their influence on the molecular weight distribution of the polyesters. Orig. art. has: 5 figures, 4 tables, and 3 chemical equations.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: OC, MT

NO REF SOV: 002

OTHER: 005

Card 2/2

L 25065-65 EWT(m)/EPF(c)/ENP(j)/T Pc-4/Pr-4 RM

ACCESSION NR: AP5002211

S/0303/64/000/006/0001/0004 24
B

AUTHOR: Sorokin, M. F.; Khinchina, E. L.

TITLE: Coatings based on polyesters of monoepoxy compounds and dicarboxylic acids

SOURCE: Lakokrasochnyye materialy i kh primeneniye, no. 6, 1964, 1-4

TOPIC TAGS: polyester coating, polymer coating, monoepoxy ester, dicarboxylic acid ester, coating hardness, coating elasticity, epoxy resin, allylglycidyl ether

ABSTRACT: A series of tests were carried out on the physical and chemical properties of coatings based on synthetic polyesters and E-40 epoxy resin⁵ as well as on unsaturated linear polyesters from allylglycidyl ether⁵ with dicarboxylic acids. First, 30% solutions of polyesters and E-40 resin were mixed with equal parts of toluene, butyl acetate and butyl alcohol to form a mixture which can be kept for some time at room temperature without solidifying. When desired, it can be solidified in 3 hours at 150C. A full-page table lists 15 such compounds with their E-40 content and values for hardness, elasticity, and resistance to water, acids and alkalis. All coatings showed good luster and adhesion to metals, glass and wood, but polyester coatings based on E-40 resin showed the highest elasticity 15

Card 1/2

L 25065-65

ACCESSION NR: AP5002211

and impact toughness. Those with E-40 and phenylglycidol or mixed phenols had a hardness of 0.7 to 0.9, while those with allylglycidyl ether and dicarboxylic acids were very soft. Polyester E-40 coatings were then tested for aging at 60C, but showed no loss of elasticity or hardness after 500 hours. Coatings based on the unsaturated polyesters of allylglycidyl ether and dicarboxylic acids were also tested after drying for 2 hours with a desiccant of lead and manganese resinsates. Double coatings 25-35 μ thick were tested after standing at room temperature for 7 days and showed an impact toughness of 50 kg/cm² and an elasticity of 1 mm. They showed no deterioration after submersion in 10% NaOH for 6 days. Orig. art. has: 2 tables and 3 figures.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: MT

NO REF SOV: 001

OTHER: 000

Card 2/2

SOROKIN, M.F.; LATOV, V.K.

Application of the light diffusion method for determining the
molecular weights of polymers. Plast.massy no.6:49-51 '64.

(MIRA 18:4)

ACCESSION NR: AP4037273

S/0190/64/006/005/0791/0797

AUTHORS: Koochnov, I. M.; Sorokin, M. F.

TITLE: Polymerization kinetics of glycidyl methacrylate

SOURCE: Vy*sokomolekulyarny*ye sovedineniya, v. 6, no. 5, 1964, 791-797

TOPIC TAGS: polymerization kinetics, methacrylate, azoisobutyric acid, initiator, polymer viscosity, molecular weight, rate constant, monomer

ABSTRACT: The kinetics of glycidyl methacrylate (GMA) radical polymerization was investigated in the presence of dinitryl azoisobutyric acid and benzoyl peroxide, initiators. An empirical equation was established relating the polymer viscosity to its molecular weight, or $[\eta] = 7.83 \cdot 10^{-3} \cdot M^{0.78}$. From the experimental data the following values are obtained for initiator rate constants as functions of temperature $k_p = 4.13 \cdot 10^5 \cdot \exp(-4000/RT)$, and for the effective activation energy,

$$k_o = 6.17 \cdot 10^7 \cdot \exp(-400/RT)$$

$E = 18.8$ kcal/mol. Other constants, such as the rate of growth termination and propagation of the chain through the monomer, have also been calculated. A list is made of GMA polymerization kinetics magnitudes with corresponding values for various

Card 1/2

ACCESSION NR: AP4037273

other ester methacryl acids. There is a close correspondence between the GMA results obtained by the authors and those methacryl esters with carbon atom numbers ranging from 1 to 4. Orig. art. has: 9 formulas, 4 figures, and 2 tables.

ASSOCIATION: Moskovskiy khimiko-tehnologicheskii institut im. D. I. Mendeleyeva
(Moscow Institute of Chemical Engineering)

SUBMITTED: 28May63

DATE ACQ: 09Jun64

ENCL: 00

SUB CODE: 00

NO REF SOV: 005

OTHER: 016

Card 2/2

ACCESSION NR: AP4037274

S/0190/64/006/005/0798/0802

AUTHORS: Sorokin, M. F.; Kochnov, I. M.

TITLE: Relative monomer reactivity in copolymerization of glycidyl methacrylate with styrene

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 5, 1964, 798-802

TOPIC TAGS: monomer reactivity, copolymerization, glycidyl methacrylate, styrene, initiator, benzoyl peroxide, reactivity ratio

ABSTRACT: Copolymerization of glycidyl methacrylate (GMA) with styrene in the presence of recrystallized dinitryl azoisobutyric acid and benzoyl peroxide has been carried out in various solvents at 60 and 120C in a nitrogen atmosphere. The composition of the resultant copolymers and the monomer reactivity ratios r_1 and r_2 have been calculated by the method of M. Fineman and S. D. Ross (J. Polymer Sci., 5, 259, 1950), producing $r_1 = 0.55$ and $r_2 = 0.45$. The monomer reactivity ratios are shown to be independent of the nature of solvent and initiator used. The variation of r_1 and r_2 with the temperature is given by an expression of the form

$$r = \exp(-\Delta E/RT),$$

tending to unity with increase in temperature. The parameters Q and e in the Card 1/2

SOROKIN, Mikhail Fedorovich; LYALYUSHKO, Kapitolina Alekseyevna;
YUKHNOVSKIY, G.L., prof., doktor khim. nauk, retsenzent;
ARKHIPOV, M.I., doktor tekhn. nauk, prof., retsenzent;
ALAVEROV, Ya.G., red.

[Practical laboratory work on synthetic polymers for lac-
quers] Praktikum po sinteticheskim polimeram dlia lakov.
Moskva, Vysshaia shkola, 1965. 271 p. (MIRA 18:7)

1. Zaveduyushchiy kafedroy Khar'kovskogo Politekhnicheskogo
instituta im. V.I.Lenina (for Yukhnovskiy).

L 54610-65 EWG(j)/EWT(m)/EPF(c)/EPF(n)-2/EWP(j)/T/EWA(h)/EWA(1) Pc-4/
Pr-4/Peb/Pu-4 GG/PM
ACCESSION NR: AP5011238 UR/0303/65/000/002/0001/0005

AUTHOR: Sorokin, M. F.; Lyalyushko, K. A.; T'ang, Tsung-lan 34
31

TITLE: Effect of gamma radiation on certain epoxy resins B

SOURCE: ¹⁹ Lakokrasochnyye materialy i ikh primeneniye, no. 2, 1965, 1-5

TOPIC TAGS: epoxy resin, gamma radiation, radiation resistance, coating

ABSTRACT: A study has been made of 1) the effect of γ -radiation on the properties of certain epoxy resins, and 2) the effect of certain hardeners on the radiation resistance of the epoxy coatings. The resins used were based on epichlorhydrin and 2,2-bis(4-hydroxyphenyl)propane or -butane, or 1,1-bis(4-hydroxyphenyl)cyclohexane. The resins were irradiated from a Co^{60} source in glass test tubes and changes in solubility in organic solvents, melting or dropping point, glycidyl group content, molecular weight, intrinsic viscosity, polydispersity and weight loss at 250C were determined. The data are presented in graphic and tabular form. It was found that at doses up

Card 1/2

L 54610-65
ACCESSION NR: AP5011238

to 100 Mrad, these properties remain virtually unchanged. When the dose is raised to 775 Mrad, the glycidyl group content drops linearly and the molecular weight and intrinsic viscosity rise logarithmically with increasing dose. The mechanical properties and gas permeability of coatings of the same resins were tested in the presence of such hardness as m-phenylenediamine, 4,4'-diaminodiphenylmethane, hexamethylenediamine, and a polyamide resin. The data, given in tabular form, indicate that the films show good radiation resistance and are suitable as radiation-resistant coatings. Orig. art. has: 7 figures, 6 tables and 2 formulas. [SM]

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: OC, NP

NO REF SOV: 003

OTHER: 007

ATD PRESS: 3239

Card

282
2/2

SOROKIN, M.F.; LATOV, V.K.

Ebulliometric determination of the molecular weight of polymers. Plast.
massy no.2:54-58 '65. (MIRA 18:7)

L 62134-65 EWT(m)/EPF(c)/ENP(i)/EPR/ENP(j)/T/ENP(t)/ENP(b) Pc-4/Pr-4/
 Pa-4 RPL JD/WW/RM
 ACCESSION NR: AP5016942 UR/0303/65/000/003/C001/0007
 667.633.263.3

AUTHOR: Sorokin, M.F.; Kochnov, I.M.; Krivopalova, I.S. 39
 B

TITLE: Synthesis of copolymers of aryl and alkyl glycidol ethers and the preparation of coatings from them

SOURCE: Lakokrasochnyye materialy i ikh primeneniye, no. 3, 1965, 1-7

TOPIC TAGS: glycidol ether, protective coating, copolymerization, polyether

ABSTRACT: The authors studied the copolymerization of phenyl and n-butyl glycidol ether with allyl glycidol ether in the presence of alkali catalysts, the properties of the copolymers obtained and the coatings based on them. The kinetics of this copolymerization were studied in the presence of KOH, and it was shown that the process occurs via a stepwise ionic mechanism with the formation of polyethers having hydroxyl groups at the ends of the polymer chains. The process of copolymerization of glycidol ethers was described in terms of the duration of the nonstationary period (τ) and overall rate constant of chain growth (k_g). The nonstationary period and rate constant of chain growth were shown to depend on the initial ratio of monomers in the reaction mixture and on the

Card 1/2

L 62134-65

ACCESSION NR: AP5016942

reaction temperature; the activation energy of the copolymerization of the glycidol ethers was also determined. The relative activities of the monomers (r_1 and r_2) during the process were calculated, and it was shown that the glycidol ethers can be arranged in the following order of reactivity: phenyl \gg allyl $>$ n-butyl. Copolymers of the glycidol ethers containing various quantities of allyl groups in the side chains were synthesized, and from these ethers, coatings possessing good mechanical properties were prepared. It was shown that varnishes could be obtained either without solvents or with a small content of the latter. Orig. art. has: 4 figures, 9 formulas and 6 tables.

ASSOCIATION: none

SUBMITTED: 00

NO REF SOV: 004

ENCL: 00

OTHER: 004

SUB CODE: OC, MT

bab
Card 2/2

L 62139-65 EWT(m)/EWP(j)/T Pc-4 RM
 ACCESSION NR: AP5018947

UR/0303/65/000/003/0032/0035
 667.633.263.3

16
 B

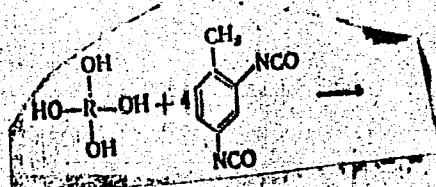
AUTHOR: Sorokin, M.F.; Kochnova, Z.A.; Zhukova, L.B.

TITLE: One-component polyurethane varnishes based on nitrogen-containing tetra-functional polymers of glycidol ethers and toluylene diisocyanate

SOURCE: Lakokrasochnyye materialy i ikh primeneniye, no. 3, 1965, 32-35

TOPIC TAGS: polyurethane varnish, glycidol ether, toluylene diisocyanate, nitrogenous polymer

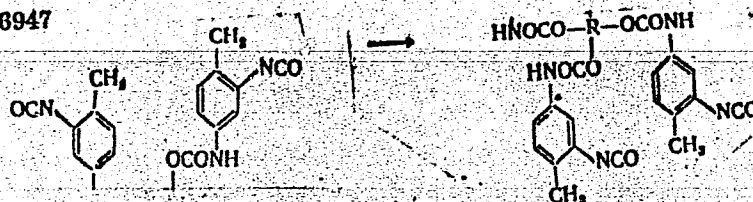
ABSTRACT: In order to obtain more stable polyurethane varnishes based on tetrafunctional nitrogen-containing polymers of glycidol ethers, the authors synthesized prepolymers with terminal isocyanate groups from these polymers and toluylene diisocyanate. The reaction may be represented as follows:



Card 1/2

L 62139-65

ACCESSION NR: AP5016947



It was found that the toluylene diisocyanate employed must have a high content of the 2,4-isomer in order to obtain a prepolymer with free NCO groups having the above structure. The characteristics of the prepolymers formed are tabulated. The stability of the prepolymer increases with increasing NCO:OH ratio. The kinetics of the reaction between butyl glycidol ether and 2,4-toluylene diisocyanate for various NCO:OH ratios were also studied. Finally, it was shown that varnish films based on these prepolymers have a high chemical stability and good physicommechanical properties. Orig. art. has: 3 figures, 2 formulas and 3 tables.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: MT, 00

NO REF SOV: 003

OTHER: 000

Card 2/2

L 65218-65 EWT(m)/EPF(c)/ENP(j)/T RM

ACCESSION NR: AP5022506

UR/0303/65/000/004/0004/0007
666.21.633

AUTHOR: Sorokin, M. F.; Lyalyushko, K. A.; Belokrinitskaya, N. Ye.

TITLE: Epoxy resins based on dicyclopentadiene and polyhydric alcohols

SOURCE: Lakokrasochnyye materialy i ikh primeneniye, no. 4, 1965, 4-7

TOPIC TAGS: epoxide, protective coating, varnish, polymerization

ABSTRACT: Alicyclic diepoxides have been prepared which are suitable for making varnish films having good mechanical properties. It is noted that alicyclic epoxides are of interest because the raw materials for them are readily available, and because films from them show improved light and thermal stability and better electrical insulation properties. First, bis(dicyclopentadienyl) ethers of ethylene glycol, diethylene glycol, and glycerol were synthesised in the presence of H_2SO_4 in 70-80% yields. From the ethers the diepoxides were obtained by epoxidation with peracetic acid in 70-80% yields. Both the ethers and the diepoxides were suitable for preparing varnish films with good mechanical properties. The ethers polymerized via the dicyclopentadienyl double bond in the presence of driers to form varnish films with an impact strength of 50 kg·cm. The diepoxides in the form of 60% solutions in

Card 1/2

L 65218-65

ACCESSION NR: AP5022506

cellulose cured in the presence of maleic anhydride at 180C to form films. Such films had an impact strength of 10--50 kg.cm and withstood 200C from 10--15 hr without degradation. Orig. art. has: 7 tables and 2 formulas. [SM]

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: MT, CC

NO REF SCV: 002

OTHER: 013

ATD PRESS: 4089

Card 2/2

SOROKIN, M.F.; BABKINA, M.M.

Composition of tricopolymers and the copolymerization constants
of butyl methacrylate, glycidyl methacrylate, and methacrylic
acid. Vysokom. soed. 7 no.4:737-740 Ap '65.

(MIRA 18:6)

1. Moskovskiy khimiko-tekhnologicheskii institut imeni Mendeleyeva.

KOCHNOV, I.M.; SOROKIN, M.F.

Kinetics of copolymerization of glycidyl methacrylate with
styrene. Vysokom. soed. 7 no.11:1916-1922 N '65. (MIRA 19:1)

1. Moskovskiy khimiko-tekhnologicheskii institut imeni D.I.
Mendeleeva. Submitted December 11, 1964.

SOROKIN, M.F.; BARKINA, M.M.

Fractionation of a triple copolymer of butyl methacrylate,
glycidyl methacrylate, glycidyl methacrylate, and methacrylic
acid. Vysokom. soed. 8 no. 1:115-119 Ja '66 (MIRA 19:1)

1. Moskovskiy khimiko-tekhnologicheskoy institut imeni Mendeleyeva.
Submitted February 24, 1965.

L 00890-66 EWT(m)/EPF(c)/EWP(j)/T WW/RM

ACCESSION NR: AP5020086

UR/0079/65/035/008/1471/1475
546.185.325 : 547.239.2 : 546.13

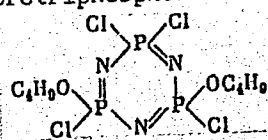
AUTHOR: Sorokin, M. F.; Latov, V. K.

TITLE: Synthesis of partial esters of phosphonitrilochloride trimer

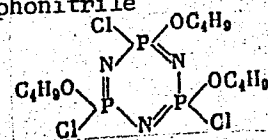
SOURCE: Zhurnal obshchey khimii, v. 35, no. 8, 1965, 1471-1475

TOPIC TAGS: ester, phosphonitrile, polymer, chlorinated aliphatic compound

ABSTRACT: Monobutoxypentachlorotriphosphonitrile, dibutoxytetrachlorotriphosphonitrile



and tributoxytrichlorotriphosphonitrile



Card 1/4

L 00890-66

ACCESSION NR: AP5020086

3
were synthesized from phosphonitrilochloride trimer and sodium butyrate using an alcohol-benzene solvent. The respective yields were 58.3, 50, and 48%. Boiling points, specific gravities, refractive indices, and chemical formulas were determined for all these compounds. Diphenoxytetrachlorotriphosphonitrile was synthesized, in the 60% yield, from phosphonitrilochloride and sodium phenolate using an alcohol-benzene solvent. The IR-spectra for these four compounds, taken with a UR-10 spectrophotometer, are shown in fig. 1 of the Enclosure. The degree of solvolysis (*S*) of sodium phenolate in reaction of the phosphonitrilochloride trimer with sodium phenolate as a function of the acidity of alcohol solvent (*K*) is shown in fig. 2 of the Enclosure. It was found that during solvolysis of sodium phenolate in alcohol, substitution with alkoxy-group takes place side by side with substitution with phenoxy-group. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskii institut im. D. I. Mendeleyeva
(Moscow Institute of Chemical Technology) 44, 55

SUBMITTED: 08Jun64

ENCL: 02

SUB CODE: GC, OC

NO REF SOV: 003

OTHER: 014

Card 2/4

L 00890-66

ACCESSION NR: AP5020086

ENCLOSURE: 01

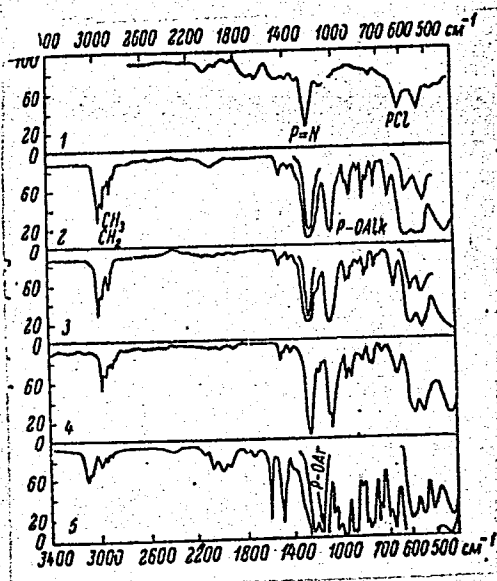


Fig. 1. IR spectra: 1--phosphonitrilo-chloride trimer (solid solution in KBr); 2--monobutoxypentachlorotriphosphonitrile; 3--dibutoxytetrachlorotriphosphonitrile (synthesized in butanol).

Card 3/4

L 00890-66

ACCESSION NR: AP5020086

ENCLOSURE: 02

0

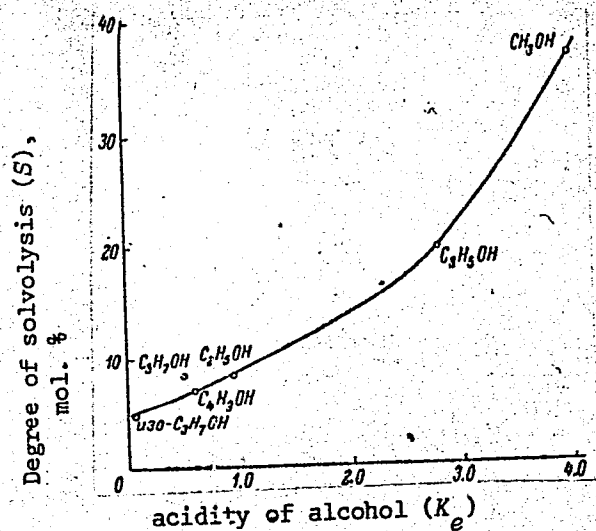


Fig. 2. Degree of solvolysis of sodium phenolate as a function of alcohol acidity.

Card 4/4

DP

L 18013-66 EWT(m)/EWP(j)/T WW/RM
ACC NR: AP6004313

SOURCE CODE: UR/0303/65/000/005/0012/0014

AUTHOR: Sorokin, M. F.; Babkina, M. M.

ORG: none

TITLE: Film-forming properties of ternary copolymers of butyl methacrylate, glycidyl methacrylate, and methacrylic acid

SOURCE: Lakokrasochnyye materialy i ikh primeneniye, no. 5, 1965, 12-14

TOPIC TAGS: methacrylate plastic, copolymer, thermosetting material

ABSTRACT: The film-forming properties of ternary copolymers of butyl methacrylate (BMA), glycidyl methacrylate (GMA), and methacrylic acid (MAA) were investigated with the aim of developing new thermosetting methacrylic copolymers. 20% lacquers were prepared from these copolymers in a mixture of solvents of the following composition: toluene, 30%; cyclohexanone, 30%; butyl acetate, 14%; acetone, 26%. Epoxy resins E-40 and E-181 were used to modify the lacquer films. The films were deposited on metal surfaces. The measured film-forming properties are tabulated. The composition of the copolymer was found to affect the properties of the lacquer films: as the content of reactive groups increases in the copolymer, the flexi-

Card 1/2

UDC: 667.633.263.3

L 18013-66
ACC NR: AP6004313

lity declines, and the hardness and chemical stability increase. The films are transparent, have a good luster, and are capable of self-curing at high temperatures. Their drawback is the lack of impact strength. When the plasticizers tricresyl phosphate (TCP) and dibutyl phthalate (DBP) are used, the impact strength improves, the other properties remaining the same. Orig. art. has: 1 figure, 2 tables.

SUB CODE: 07/
11/

SUBM DATE: 00/

ORIG REF: 000/

OTH.REF: 000

Card 2/2 *mgs*

L 18416-66 EWT(m)/EWP(j)/T WW/RM
 ACC NR: AP6003422 (A)

SOURCE CODE: UR/0190/66/008/001/0115/0119

AUTHORS: Sorokin, M. F.; Babkina, M. M.

ORG: Moscow Institute of Chemical Engineering im. D. I. Mendeleyev (Moskovskiy khimiko-tekhnologicheskii institut)

TITLE: Fractionation of a triple copolymer of butyl methacrylate, glycidyl methacrylate, and methacrylic acid

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 1, 1966, 115-119

TOPIC TAGS: copolymer, methacrylate plastic, polymerization degree

ABSTRACT: Molecular weight distribution of a triple copolymer of butyl methacrylate (I), glycidyl methacrylate (II), and methacrylic acid (III) was investigated by means of fractionation and examination of properties of the obtained fractions. Composition of the copolymer in mole % is: I:II:III = 74.10 : 9.65 : 16.25. Synthesis followed that described previously by the authors (Tr. Mosk. khim.-tekhnol. in-ta im. D. I. Mendeleyeva, vyp. 48, 1965). Fractionation was achieved by means of a repeated fractional precipitation with water from 2% solution in dioxane at 20C. Molecular weight, composition, and specific viscosity of the

Card 1/3

UDC: 678.01:53+678.744

L 18416-66

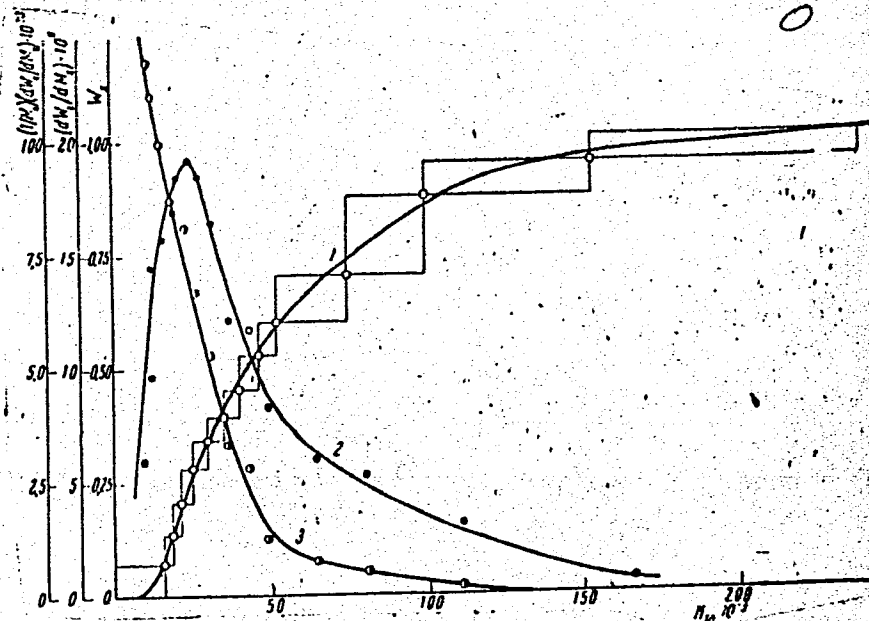
ACC NR: AP6003422

copolymer were determined in each fraction. Molecular weight distribution curves are shown in Fig. 1. Viscosity η as function of concentration was determined according to the Schulz-Blaschke equation. Constant $K' = 0.95$ was calculated which permitted determination of η at certain copolymer concentrations in acetone solution. The empirical relation between η and molecular weight is given by the equation $[\eta] = 5,25 \cdot 10^{-3} M^{0.76}$.

Card 2/3

L 18416-66
ACC NR: AP6003422

Fig. 1. Molecular weight distribution curves for copolymer I, II, and III: 1 - weight integral distribution; 2 - weight differential distribution; 3 - number distribution.



Orig. art. has: 3 tables, 4 figures, and 3 equations.

Card 3/3 SUB CODE: 07/ SUBM DATE: 24Feb65/ ORIG REF: 001/ OTH REF: 006
pa

L 22751-66 EWT(m)/EWP(i)/T/ETC(m)-6 LJP(c) WW/RM	
ACC NR: AP6010108	SOURCE CODE: UR/0190/66/008/003/0444/0449
AUTHORS: <u>Sorokin, M. F.; Manovichu, I.</u>	
ORG: <u>Moscow Chemical and Technological Institute im. D. I. Mendeleev</u> (Moskovskiy khimiko-tekhnologicheskii institut)	
TITLE: <u>Polycondensation of allylphosphinic</u> and dichloride with glycols and diatomic phenols	
SOURCE: <u>Vysokomolekulyarnyye soyedineniya</u> , v. 8, no. 3, 1966, 444-449	
TOPIC TAGS: glycol, phosphorus chloride, diethylene glycol, hydro- quinone, resorcinol, hydrogen chloride, propane, phenol, polycondensation	
ABSTRACT: Self-extinguishing phosphorus containing polyesters have been prepared by polycondensation of allylphosphinic acid dichlorides with diethylene glycol, triethylene glycol, hydroquinone, resorcinol, and 2,2-di-(4-hydroxyphenyl) propane. It was established that oligomers are formed during the interaction of acid dichlorides of allylphos- phinic acids with the dihydroxy compounds. Parallel to the formation of polyesters from glycols, the polymer decomposition caused by the hydrogen chloride liberated during the reaction, occurs; there is no decomposition with the use of diatomic phenols. It was found that <u>phosphorus-containing polyesters are not easily inflammable and</u>	
Card 1/2	UDC: 541.64+678.86

L 22751-66

ACC NR: AP6010108

extinguish instantly after being taken out of the flame. Orig. art.
has: 3 figures and 2 tables. [Based on author's abstract] [NT]

SUB CODE: 07/

SUBM DATE: 25Mar65/

ORIG REF: 007/

OTH REF: 014/

Card 2/2

L 27311-66 · EWT(m)/EWP(j)/I IJP(c) WW/RM

ACC NR: AP6008973

SOURCE CODE: UR/0190/65/CO7/011/1916/1922

AUTHORS: Kochnov, I. M.; Sorokin, M. F.

ORG: Moscow Institute of Chemical Technology im. D. I. Mendeleev (Moskovskiy khimiko-tekhnologicheskii institut)

TITLE: Kinetics of copolymerization of glycidyl methacrylate and styrene

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 11, 1965, 1916-1922

TOPIC TAGS: copolymer, radical polymerization, polymerization kinetics, styrene

ABSTRACT: The effect of different solvents and initiators on the radical copolymerization kinetics of the reaction between glycidyl methacrylate and styrene was determined. The reaction was studied in the bulk and in the solvents toluene, cyclohexanone, and dioxane. Diniryl of azobutyric acid and benzoyl peroxide were used as initiators. The copolymerization rate constants, the rate of copolymerization, and the cross termination constants ϕ were determined as functions of the initial concentration of reactants, nature of solvent, and initiator. The activation energy of the copolymerization was also determined. The rate of the reaction obeyed the expression

Card 1/3

UDC: 66.095.26+678.744+678.746

L 27311-66

ACC NR: AP6008973

$$v_{\text{cop}} = K_{\text{cop}} [I]^{1/2} ([A] + [B])^{1/2}$$

where v_{cop} is the rate of copolymerization, K_{cop} is the rate constant (I), and $([A] + [B])$ the initiator and total monomer concentration respectively. The cross termination constants were derived after I. M. Kochonov (Dissertatsiya, 1964)

$$v_{\text{cop}} = \frac{v_A \cdot v_B \cdot \psi}{(\rho + 2 \cdot \Phi \cdot \gamma + \mu)^{1/2}}$$

$$\text{where } \psi = r_1[A]^2 + 2[A] \cdot [B] + r_2[B]^2, \quad \rho = (r_1 \cdot v_B \cdot [A_p] \cdot [A])^2, \quad \gamma = r_1 \cdot r_2 \cdot v_B [A_p] [B_p] [A] [B] \text{ and } \mu = (r_2 \cdot v_A [B_p] [B])^2; [A_p] \text{ and } [B_p] -$$

where v_A and v_B are the separate polymerization rates for the polymerization of A and B respectively, and (A_p) , (B_p) , (A) , (B) are the initial monomer concentrations for the individual and copolymerization of A and B respectively. The experimental results are presented in graphs and tables (see Fig. 1). It was found that the energy of activation for the copolymerization was independent of the nature of the solvent.

Card 2/3

L 27311-66

ACC NR: AP6008973

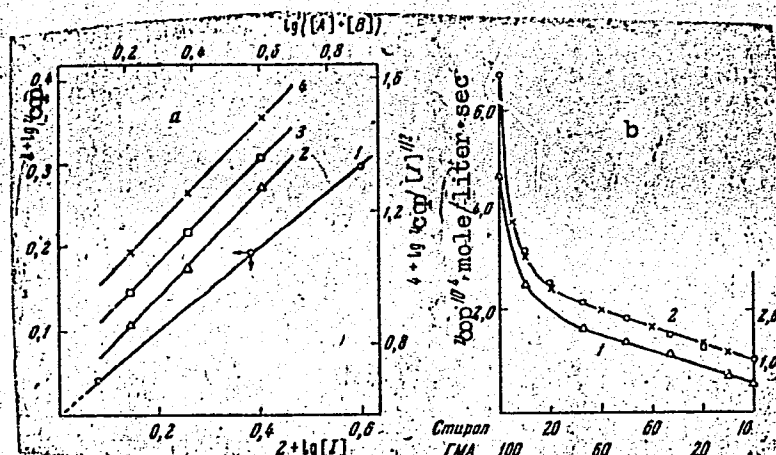


Fig. 1. Dependence of the rate of copolymerization of glycidyl methacrylate and styrene: a - on concentration of initiator and monomers. 1 - copolymerization in bulk; 2 - in toluene; 3 - in dioxane; 4 - in cyclohexanone. b - on the initial monomer composition: 1 - copolymerization in bulk (60C); 2 - in dioxane (80C); A composition of monomer mixture in mole %.

Orig. art. has: 3 tables, 3 graphs, and 6 equations.

SUB CODE: 11/

SUBM DATE: 11Dec64/

ORIG REF: 006/

OTH REF: 004

Card 3/3

1. 441200-00

ACC NR: AF6019445 (A) SOURCE CODE: UR/0308/66/000/003/0003/0006

AUTHOR: Sorokin, M. F.; Sokol, I. N.

ORG: none

TITLE: Setting of epoxy resins¹⁵ with esterified phenolformaldehyde resins

SOURCE: Lakokrasochnyye materialy i ikh primeneniye, no. 3, 1966, 3-6

TOPIC TAGS: phenolformaldehyde, ~~phenolformaldehyde~~ resin, epoxy resin *plastic*

ABSTRACT: Phenolformaldehyde resins¹⁵ esterified with allyl bromide can be used as hardening agents for epoxy resins, including low-molecular resins. They are found to be more active hardeners than nonesterified phenolformaldehyde resins. Compound compositions with hardening properties can be produced without solvents. ¹⁵Films made of these compositions are found to have high mechanical properties. Orig. art. has: 4 figures and 2 tables. [Translation of authors' abstract] [AM]

SUB CODE: 07/ SUEM DATE: none/ ORIG REF: 003/ OTH REF: 003

Card 1/1 mjs

L 29545-66 EWT(m)/EWP(j)/T IJP(c) RM

ACC NR: AP6007772 (N)

SOURCE CODE: UR/0195/66/007/001/0042/0048

AUTHOR: Sorokin, M. F.; Latov, V. K.

ORG: Moscow Chemical Engineering Institute im. D. I. Mendeleyev (Moskovskiy khimikotekhnologicheskii institut)

TITLE: Kinetics of the reaction of phosphonitrile chloride trimer with Na alcohates

SOURCE: Kinetika i kataliz, v. 7, no. 1, 1966, 42-48

TOPIC TAGS: phosphonitrile, ethanol, methanol, chloride, sodium compound, reaction rate

ABSTRACT: The kinetics of the reaction of phosphonitrile chloride (PNC) trimer and its incomplete butyl esters (monobutoxypentachlorotriphosphonitrile, dibutoxytetrachlorotriphosphonitrile, and tributoxytrichlorotriphosphonitrile) with sodium butoxide in butanol, sodium ethoxide in ethanol, and sodium methoxide in methanol were studied. The reaction is first order with respect to the PNC trimer, its esters, and the alkoxide ion, and zero order with respect to the alcohol. An

Card 1/2

UDC: 541.124 : 542.951.3

L 29545-66

ACC NR: AP6007772

increase in the dielectric constant of the medium was found to accelerate the reaction rate. An increase in the degree of substitution of chlorine atoms in the PNC trimer by butoxy groups sharply lowers the reaction rate, raises the activation energy, and leads to a decrease in the entropy of activation and the steric factor. A transitional state involving a change from the tetra- to the pentacoordination of phosphorus is proposed. Orig. art. has: 5 figures, 3 tables, and 6 formulas.

SUB CODE: 07/ SUBM DATE: 12May64/ ORIG REF: 004/ OTH REF: 014

Card 2/2 *fv*

ACC NR: AP6006717

(A)

SOURCE CODE: UR/0303/66/000/001/0004/0009

AUTHOR: Sorokin, M. F.; Chibisova, Ye. I.

ORG: none

TITLE: Polyester varnish resins containing anhydride of 1,4,5,6,7,7-hexachlorobicyclo-(2,2,1)-5-heptyl-2,3-dicarboxylic acid

SOURCE: Lakokrasochnyye materialy i ikh primeneniye, no. 1, 1966, 4-9

TOPIC TAGS: phthalic anhydride, polyester plastic, varnish, paint, lacquer, polycondensation, aliphatic alcohol, polyhydroxy aliphatic alcohol

ABSTRACT: Kinetics of the polycondensation of the anhydride of 1,4,5,6,7,7-hexachlorobicyclo-(2,2,1)-5-heptyl-2,3-dicarboxylic acid with ethyleneglycol, glycerine, and xylitol was studied in the 140-230°C range. The molar ratios of anhydride to glycol were of 1:1 to 1:2.5 and the reaction duration was 2-6 hr. The properties of the reaction products as coatings were compared to those based on phthalic anhydride. The rates of the polycondensation reaction and the energies of activation are graphed and tabulated. It was found that this polycondensation is a two-stage reaction. The first of these stages is fast, almost independent of temperature, and leads to the formation of the acidic esters. The second stage, highly temperature dependent, was found to be a second order reaction. The activation energies of the polycondensation reactions involv-

UDC: 667.633.263.3

Card 1/2

ACC NR: AP6006717

ing glycerine and xylitol were found to be 17-18 kcal/mol and that involving ethylene-glycol was found to be 14.5 kcal/mol. All the polycondensation products have lower acid numbers than those of the corresponding products based on phthalic anhydride. It is claimed that these polycondensation products lead to higher quality varnishes and paints than those based on phthalic anhydride. Orig. art. has: 8 figures, 6 tables.

SUB CODE: 07// SUBM DATE: none/ ORIG REF: 004/ OTH REF: 005

Card 2/2

ACC NR: AR6031252 (A) SOURCE CODE: UR/0081/66/000/011/S020/S020

AUTHOR: Sorokin, M. F. ; Babkina, M. M.

TITLE: Synthesis and study of butylmethacrylate copolymers with glycidylmethacrylate and methacrylic acid

SOURCE: Ref. zh. Khimiya, Part II, Abs. 11S121

REF SOURCE: Tr. Mosk. khim. -tekhnol., in-ta im. D. I. Mendeleeva, vyp. 48, 1965, 201-207

TOPIC TAGS: copolymer, methacrylic acid, butylmethacrylate, glycidylmethacrylate, thermosetting copolymers

ABSTRACT: The synthesis of butylmethacrylate copolymers (I) with glycidylmethacrylate (II) and methacrylic acid (III) was carried out in cyclohexanone (IV) and dioxane (V) at 70, 80, and 90C. Benzoyl peroxide (IV) and dinitrile of azodi-isobutyric acid (VII) in amounts of 0.1, 0.2, 0.4 and 0.8 mol % were used as initiators. The monomer concentration in the reaction mixture amounted to 20, 30, and 40% and the molecular ratios varied over a wide range. The copolymerization rate (CR) increased with an increase in (II) concentration, while (III) in concentration of less

Card 1/2

ACC NR: AR6031252

than 25 mol % was found to retard CR. However, an acceleration of CR was observed with an increase in the mole fraction of III, accompanied by an increase in viscosity of the solution, which gelatinizes on reaching a 70% conversion of the monomer. Such a phenomenon is explained by the capacity of III to form an H-bond with compounds containing carbonylic oxygen, which is also true for II, IV and III. An increase in reaction temperature and in VI and VII concentrations causes an increase of the rate of copolymerization and a decrease in the molecular weight of the copolymers. The CR, the molecular weight, and the yield of copolymers increase with an increase in concentration of the monomers in the solution. IV and V do not substantially affect CR. The polydispersion of copolymers increases with an increase of I content and also with increases in the reaction temperature and concentrations of VI and VII. VI and V do not affect the polydispersion. The triple thermosetting copolymers obtained are capable of self setting at higher temperatures. Some properties of the copolymers were determined. V. Agasandyan. [Translation of abstract]

SUB CODE: 07/

Cord 2/2

SOROKIN, M. G. --

"Method of Calculation and Investigation of the Operation of a Wind Motor With Large Initial Starting Moment."
Cand Tech Sci, All-Union Sci-Res Inst of Electrification of Agriculture,
Moscow, 1954. (RZhMekh, Oct 54)

Survey of Scientific and Technical Dissertations Defended at
USSR Higher Educational Institutions (10)

SO: Sum. No. 481, 5 May 55

KRAVCHENKO, V.I.; MIRZAKHEYEV, K.M.; SOROKIN, M.G.

Results of preliminary tests of the 1-D-18 wind power plant. Izv.
AN Kazakh.SSR.Ser.energ. no.4/5:128-141 '54. (MLRA 9:5)
(Wind power)

SOROKIN, M. G.

"Biological and Morphological Variations in the Raccoon Dog (*Lycerentes procyonoides arai*), Which Is Being Acclimated in Kalininskaya Oblast." Cand Biol Sci, Kalinin State Pedagogical Inst, Kalinin, 1954. (RZhBiol, No 1, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (13) SO: Sum. 508, 29 Jul 55

SHAPOSHNIKOV, L.V., doktor biolog.nauk, prof.; GOLOVIN, O.V., kand.biolog.nauk; SOROKIN, M.G., kand.biolog.nauk; TARAKANOV, A.D., starshiy prepodavatel'. Prinimali uchastiye: V'YUNOV, V.N.; SOKOLOV, P.P., inzh.-ryboved; VIKTOROV, G.S., tekhn.red.

[Animal world of Kalinin Province] Zhivotnyi mir Kalininskoi oblasti. Kalinin, Kalininskoe knizhnoe izd-vo, 1959. 459 p.
(MIRA 13:10)

1. Nachal'nik Kalininskogo oblastnogo upravleniya okhotnich'yego khozyaystva (for V'yunov).
(Kalinin Province--Vertebrates)

SOROKIN, M.G.; SOKOLOV, A.A.

Morphology and biology of the northern birch mouse (*Sicista betulina* Pall.) in Kalinin Province. Nauch. trudy Kal. otd. MOIP no.2:31-40
'60. (MIRA 14:10)

(KALININ PROVINCE...BIRCH MOUSE)

AUTHORS: Sinel'nikova, L.A. and Sorokin, M.I. 68-58-3-16/22
TITLE: Automatic Weighing of Coal Blend Charged into Ovens
(Avtomaticheskoye vzveshivaniye ugol'noy shikhty)
PERIODICAL: Koks i Khimiya, 1958, Nr 3, pp 55 - 56 (USSR).
ABSTRACT: An installation for the automatic weighing of the coal
blend charged to ovens developed by KIP on the Kuznetsk
Metallurgical Combine is described. There is 1 figure.
ASSOCIATION: Kuznetskiy metallurgicheskiy kombinat
(Kuznetsk Metallurgical Combine)

Card 1/1

KARPOV, A.G.; SOROKIN, M.I.

Computers serve the economy. Stal' 23 no.12:1122-1123 D '63.
(MIRA 17:2)

1. Volgogradskiy metallurgicheskiy zavod "Krasnyy Oktyabr'".

SOROKIN, M. I. Cand Agr Sci -- (diss) "On ^{potato}~~the~~ problems of ~~the~~ agricultural engineering and ~~potato~~^{seed} growing in bottom lands." Mos, 1957. 21 pp
(Mos Order of Lenin Agr Acad im K. A. Timiryazev), 110 copies (KL, 3-58, 98)

USSR/Cultivated Plants - Potatoes. Vegetables. Melons.

M

Abs Jour : Ref Zhur Biol., No 12, 1958, 53612

Author : Sorokin, M.I.

Inst : Moscow Agricultural Academy imeni K.A. Timiryazev

Title : Some Methods of Increasing the Potato Yield and of Improving Its Quality on Flood Lands.

Orig Pub : Dokl. Mosk. s.-kh. akad. imeni. K.A. Timiryazeva, 1957
vyp. 28, 222-227

Abstract : This is a study of the effect of mellowing and mowing the tillable horizon of bottom land soil to the depth of 25-27 cm, - on the yield and the planting qualities of potato tubers of the Lorkh and Epron varieties. The soil was plowed to the depth of 25-27 cm. With plowing and pulverizing, the increase in the yield of the Lorkh variety comprised 26 centners/ha or 16.5%. With plowing

Card 1/2

- 38 -

POLTAVSKAYA, Lyudmila Semenovna, kand.biolog.nauk; SOROKIN, Mikhail Ivanovich,
kand.sel'skokhoz.nauk; KELIN, M., red.; CHIZHIKOVA, V., tekhn.red.

[Corn pests and diseases and their control in Mordovia] Vrediteli
i bolezni kukuruzy i bor'ba s nimi v usloviakh Mordovii. Saransk,
Mordovskoe knizhnoe izd-vo, 1960. 47 p.

(MIRA 14:3)

(Mordovia--Corn (Maize)--Diseases and pests)

SOROKIN, M.I., kand.sel'skokhozyaystvennykh nauk; KOVAL'CHUK, P.A., agronom

Effectiveness of supplementary spring fertilizing of perennial
grasses. Uch. zap. Mord. gos. un. no.13:106-109 '60.

(MIRA 15:11)

1. Kafedra agronomii i pochvovedeniya Mordovskogo
gosudarstvennogo universiteta.

(Mordovia--Grasses--Fertilizers and manures)

SOROKIN, M.I., kand.sel'skokhozyzystvennykh nauk; SHURKIN, V.P.

Pea cultivation in the Mordovian A.S.S.R. Zemledelie 24 no.4:
36-39 Ap '62. (MIRA 15:4)

1. Mordovskaya respublikanskaya gosudarstvennaya sel'skokhozyzystven-
naya stantsiya.

(Mordovia--Peas)

SOROKIN, M.M.

Propagandists of new ideas. Nauka i zhyttia 11 no. 4:28 Ap '61.
(MIRA 14:5)

1. Predsedatel' gruppy Obshchestva dlya rasprostraneniya politicheskikh
i nauchnykh znaniy USSR na Khar'kovskom turbinnom zavode im. Kirova.
(Kharkov---Machinery industry---Technological innovations)

137-58-4-6402

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 10 (USSR)

AUTHOR: Sorokin, M. M.

TITLE: Improving the Quality of Zinc and Lead Concentrates by Separation of Middlings (Uluchsheniye kachestva tsinkovykh i svintsovykh kontsentratov s vydeleniyem promproduktov)

PERIODICAL: Sb. tr. Vses. n.-i. in-ta tsvetn. met., 1956, Nr 1, pp 17-29

ABSTRACT: Experiments performed on the removal of lead from Zn concentrate in the course of an industrial process have shown that removal of a portion of the Pb and Cu from the concentrates may be accomplished by refloating. The conditions of refloating depend upon the nature of the relationship among the Pb, Cu and Zn minerals. If these minerals are segregated, for the most part, separation of the Pb minerals may be performed after treatment of the concentrate by elevated amounts of a mixture of cyanide and chlorine salts of calcium and sodium. If the Pb minerals are primarily in concretions with ZnS, separation requires very fine grinding of the concentrate. The best results in removal of zinc from Pb concentrate are obtained by deinking the PbS by lime (4.5-6 kg/t). The employment of CuSO_4 increases

Card 1/2

137-58-4-6402

Improving the Quality of Zinc and Lead Concentrates (cont.)

extraction of zinc in the froth product. As CuSO_4 consumption is varied from 0 to 2.0 kg/t, the extraction of Zn in the crude froth product rises from 30 to 75 percent, and the recovery of Pb from 10 to 20 percent. Investigation of the conditions for fining flotations of the froth product showed the best results to be obtained by fining the crude froth product with potassium bichromate.

A. Sh.

1. Ores--Processes
2. Ores--Separation
3. Flotation--Applications

Card 2/2

pa

Sorokin, M.M.

9.4250

81998

S/120/60/000/03/038/055
E032/E514

AUTHOR: Sorokin, M.M.

TITLE: The NVO-40 Air-Cooled High-Vacuum Oil Diffusion Pump³

PERIODICAL: Pribery i tekhnika eksperimenta, 1960, No 3,
pp 131-133

ABSTRACT: A three-stage oil diffusion pump of an almost conventional design is described. A sectional drawing through the pump is shown in Fig 1. The pump is air-cooled with the aid of a built-in fan. The cooling is facilitated by a large number of cooling fins mounted on the outside of the pump. The design of the vapour column is shown in Fig 2. The overall dimensions of the pump are: length 28.2 cm, diameter 12 cm. The characteristics are as follows: limiting vacuum 5×10^{-6} mm Hg, power consumption 0.45 kW, oil charge 100 cm³, mean pumping speed for air 50 l/sec, mean pumping speed for helium 100 l/sec (stable). The weight of the pump is 8 kg. Fig 3 shows the pumping speed for air (1) and helium (2) as a function of the power consumption. Fig 4 shows the dependence of the pumping speed for air (1) and

Card 1/2

SOROKIN, M.M.

Innovators promote advanced experience. Mashinostroitel' no.7:24 J1
'62. (MIRA 15:7)

(Kharkov--Turbogenerators)

1st and 2nd Order

PROCESSES AND PROPERTIES INDEX

7

A rapid method for the analysis of mixtures of sulfuric and formic acids. R. B. El'gart and M. M. Surpkin. *Leibniz. Prom.* 2, No. 8, 55-0(1939); *Chem. Zentr.* 1940, I, 438.—Transfer a 25-cc. sample of the liquid to a 50-cc. flask, and fill to the mark with water. Titrate an aliquot of 10 cc. with 0.5 N NaOH to a phenolphthalein end point. Take 10 cc. more of the soln. evap. to 1.5-2 cc. on the sand bath (140-50°) and titrate an aq. soln. of the residue to a Me orange end point. This last titration gives the H₂SO₄ content and the first titration gives both acids. W. A. Moore

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION

COMMON ELEMENTS

COMMON VARIANTS INDEX

COMMON ELEMENTS

COMMON VARIANTS INDEX

CA 26

The content of pinene in commercial crude turpentine.

1. M. M. Savokin. *Leobkum. Prom.* 1930, No. 10, 61-4;
Khim. Rev. 1940, No. 2, 117. Pinene was detd.
 by distg. turpentine oil in a 100 Point column at 20-5
 mm. Hg pressure and detg. n for each fraction. All tur-
 pentines are classified in 3 groups, those contg. over 70%,
 those contg. 65-70% and those contg. less than 65% of
 pinene. No regularity was observed between the content
 of pinene and the fraction boiling up to 102°.

W. R. Henn

ASAC 114 METALLOGICAL LITERATURE CLASSIFICATION

1141137 One Only 151

SOROKIN, M.M. (Moskva)

Electrochemical disintegration of copper sulfides. Izv.AN SSSR.
Otd.tekh.nauk.Met.i topl. no.3:104-108 My-Je '60.
(MIRA 13:6)

(Copper sulfides--Electrometallurgy)

GLEMBOTSKIY, V.A., doktor tekhn.nauk; SOROKIN, M.M., aspirant

Deactivation of sphalerite in an acid medium. Nauch.sooob.
Inst.gor.dela 6:77-84 '60. (MIRA 15:1)
(Sphalerite)

GLEMBOTSKIY, V.A.; SOROKIN, M.M.

New inhibitor for bornite and chalcocite in the selection of combined copper-zinc and copper-lead concentrates. Dokl. AN SSSR 134 no.5: 1146-1149 O '60. (MIRA 13:10)

1. Institut gornogo dela Akademii nauk SSSR. Predstavleno akademikom A.A.Skachinskim.
(Bornite) (Chalcocite)

SOROKIN, M. M., Cand. Tech. Sci. (diss) "Investigation of Methods of Selection of Sphalerite and Secondary Sulfides of Copper under Conditions of Flotation of Copper-Zinc Ores," Moscow, 1961, 23 pp. (Krasnoyarsk Inst. Non-Ferr. Metals) 200 copies (KL Supp 12-61, 374).

SOROKIN, M.M., kand.tekhn.nauk, prof.; GLEMBOTSKIY, V.A., doktor tekhn.nauk;
RAUKHVARGER, Ye.L., kand.tekhn.nauk

Flotation properties of some compounds of the aromatic series. Na-
uch. soob. IGD 19:12-23 '63. (MIRA 17:2)

SOROKIN, M.M.; RAUKHVARGER, Ye.L.; SHCHEVELEVA, A.S.

Problem of the flotation action of willow oil and its components.
Zhur. prikl. khim. 37 no.2:422-429 F '64.

(MIRA 17:9)

1. Institut gornogo dela imeni Skochinskogo.

SOROKIN, M.M., kand.tekhn.nauk; RAUKHVARGEN, Ye.I., kand.tekhn.nauk

Decreasing the harmful effect of mineral salt in the flotation of
martite. Gor.zhur. no.12:51-52 D '64.

(MIRA 18:1)

1. Institut gornogo dela im. A.A.Skochinskogo.

L 17105-66 EWT(1)/EWT(m)/EPF(n)-2/T/EWP(t)/ETC(m)-6 GG/JD/WW/DJ
 ACC NR: AP6004463 SOURCE CODE: UR/0048/66/030/001/0037/0042

56
52
B

AUTHOR: Sorokin, M. M.; Baryshova, N. M.

ORG: none

TITLE: Obtaining ultrahigh vacuum with oil diffusion pumps (Transactions of the Second All-Union Symposium on the Physics of Thin Ferromagnetic Films held at Irkutsk 10 July to 15 July 1964)

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 1, 1966, 37-42

TOPIC TAGS: ultrahigh vacuum, high vacuum technique, vacuum pump, diffusion pump, vacuum oil

ABSTRACT: Examples of Soviet pumps employing type VM-1 oil (vapor pressure 3×10^{-8} torr at 20C) were used to illustrate the possibilities of oil diffusion pumps as means for obtaining ultrahigh vacuum. To reach vacuum higher than 5×10^{-7} torr it is necessary to use special means to suppress the emission of pump oil into the vacuum. A pair of N-1S-2 pumps in series were provided with water-cooled oil baffles and louvered traps with a conductivity of 50 liter/sec, and their performance was investigated after 24 hour baking at 250C. The pressure was measured with a IM-9F open manometer and the composition of the residual gas was determined with a RMO-4S omegatron. After 3 hours of pumping the pressure was 4×10^{-9} torr; the pressure remained at this value for 10-30 hours and then gradually increased to

Cord 1/2

L 17405-66

ACC NR: AP6004463

4
 2×10^{-8} torr. In the earlier higher vacuum period no molecules with molecular weight exceeding 44 were observed in the residual gas; after 30 hours heavier components appeared and ultimately predominated. In the absence of lower vapor pressure oils, such as the OS-124 and DC 705 fluids available in Western Europe and America, higher vacua can be reached only with the aid of liquid nitrogen cooled traps and sorption traps. Several such traps of Soviet manufacture are briefly described. With a type N-015-S pump and a liquid nitrogen or an activated charcoal trap, a vacuum of 2×10^{-8} torr was reached in which the residual gas was mostly hydrogen, contained nothing of molecular weight greater than 44, and remained unchanged in composition during 100 hours of operation. The types VA-05-5 and VA-5-7 vacuum systems (not described) performed considerably better, it being possible to achieve an oil-free vacuum of 10^{-10} torr. It is concluded that oil diffusion systems deserve more widespread use for the production of oil-free ultrahigh vacuum than they presently enjoy in the Soviet Union. Orig. art. has: 6 figures. [15]

SUB CODE: 20/ SUBM DATE: none/ ATD PRESS: 4206

13/

Card 2/25

L 16986-66 EWT(1)/EWT(m)/EPF(n)-2/T/ETC(m)-6 WW/DJ
 ACC NR: AP6001581 (N) SOURCE CODE: UR/0120/65/000/006/0145/0149
 AUTHOR: Sorokin, M. M. 49
 ORG: none 43
 TITLE: High-vacuum oil vapor pumps with improved characteristics B
 SOURCE: Pribery i tekhnika eksperimenta, no. 6, 1965, 145-149
 TOPIC TAGS: vacuum pump, high vacuum pump, high vacuum technique / TsVL-100S
 vacuum pump, N-1S-2 vacuum pump, N-5S-2 vacuum pump, N-2T-2 vacuum pump, N-5T-2 vacuum pump, N-8T-2 vacuum pump, N-015-S vacuum pump, NVO-40 vacuum pump
 ABSTRACT: High-vacuum oil vapor pumps with improved characteristics are discussed. Most commercial vacuum pumps (such as TsVL-100S, N-2T, N-5T, N-8T) can operate at 10^{-5} -- $2 \cdot 10^{-4}$ tor with a maximum exhaust pressure of $7.5 \cdot 10^{-2}$ -- 10^{-1} tor. Some operating characteristics of a common pump (NVO-40) are presented as an example. By improving the cleaning and fractionation of the oil, by using metal seals, and by heating the chamber to 300-350C, the pump range can be improved to $3-5 \cdot 10^{-8}$ tor. Based on the configuration shown in Fig. 1, a number of pumps have been

Card 1/2

UDC: 533.563.5

L 16986-66

ACC NR: AP6001581

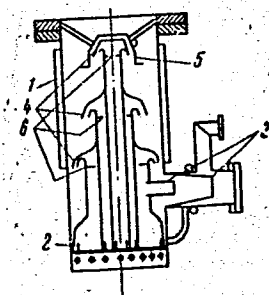


Fig. 1. Schematic diagram: 1 - shortened cooling jacket; 2 - fractionation rings; 3 - ejector; 4 - "umbrella" stages; 5 - oil baffle; 6 - throttling plates.

developed recently. These "Series 2" pumps with capacities of 100-8000 liter/sec have more desirable characteristics. All these pumps (N-1S-2, N-5S-2, N-5T-2, N-8T-2) are similar in construction to N-2T-2. A smaller capacity pump (15 liter/sec, 10^{-6} tor) was also developed. A table of the operating ranges of these vacuum pumps is presented. The author thanks K. A. Nesterovaya, N. Z. Sabirzyanov, F. D. Putilovskiy, I. M. Chistopolov, N. M. Mosin, and R. S. Gariffulin for their participation in the work. Orig. art. has: 6 figures and 1 table.

SUB CODE: 13/ SUBM DATE: 14Dec64/ ORIG REF: 002/ OTH REF: 002

Card 2/2 2285

ACC NR: AP6036839

SOURCE CODE: UR/0020/66/171/002/0320/0323

AUTHOR: Bokshitskiy, I. Ya.; Yelyutin, O. P.; Rogova, I. V.; Sorokin, M. N.

ORG: Central Scientific Research Institute of Ferrous Metallurgy im. I. P. Bardin
(Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii)

TITLE: Influence of group-IV transition elements and of Cu on the structure and physical properties of alloys based on the compound NiMn

SOURCE: AN SSSR. Doklady, v. 171, no. 2, 1966, 320-323

TOPIC TAGS: nickel alloy, manganese containing alloy, transition element, alloy, phase diagram, resistivity, electric property

ABSTRACT: To investigate the structure and physical properties of alloys of the compound NiMn with transition elements, the authors fused pseudobinary alloys NiMn-Me (Ti, V, Cr, Fe, Co, Cu) containing 1-20 at.% V and Ti, and 1-10 at.% Cr, Fe, Co, Cu. The tests considered of a dilatometric analysis in the 100 -- 950° interval, measurements of the electric resistivity as a function of the alloying-additive content, an electron-microscopic investigation of the structure, and an x-ray phase analysis. The dependence of the electric properties and of the structure of the alloy as a function of the heat treatment was tested in the case of NiMn + 10 at.% V. The tests yielded the phase compositions of the different alloys and the types of crystal

Card 1/2

UDC: 669.018.5:669.017.11:537.3:669.017.3:621.78

ACC NR: AP6036839

structure. The results indicate that the observed high resistivity of the alloys is connected with the structure of the metastable γ' phase and depends on the nature of the alloying elements. The necessary condition for obtaining the γ' phase is quenching from the unstable β phase which exists in such alloys. The resistivity decreased as a rule with increasing atomic number of the additive, and increased very strongly with increasing atomic percentage of the additive. This report was presented by Academician G. V. Kurdymov 4 February 1966. Orig. art. has: 3 figures and 2 tables.

SUB CODE: 20, 11/ SUBM DATE: 03Feb66/ ORIG REF: 007/ OTH REF: 005

Card 2/2

KUNAKOV, Ya.N.; LIVSHITS, B.G.; SOROKIN, M.N.

Deformation of textures in silicon iron. Izv. vys. ucheb. zav.;
chern. met. 6 no.5:146-150 '63. (MIRA 16:7)

1. Moskovskiy institut stali i splavov.
(Iron-silicon alloys--Metallography)
(Deformation (Mechanics))

L 13381-66 EWP(e)/EWT(m)/EWA(d)/EWP(t)/EWP(z)/EWP(b) IJP(o) JD/HW/JT
ACC NR: AP6002905 SOURCE CODE: UR/0286/65/000/024/0072/0072

INVENTOR: Yelyutin, O. P.; Bokshitskiy, I. Ya.; Rogova, I. V.; Sorokin, M. N. 48
B

ORG: none

TITLE: High-resistivity alloy, ⁶⁵Class 40, No. 177075⁶ [announced by
Central Scientific Research Institute of Ferrous Metallurgy im.
I. P. Bardin (Tsentral'nyy nauchno-issledovatel'skiy institut chernoy
metallurgii)]

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 24, 1965, 72

TOPIC TAGS: alloy, high resistivity alloy, nickel containing alloy,
manganese containing alloy, vanadium containing alloy

ABSTRACT: This Author Certificate introduces a high-resistivity alloy
containing 42—50% ²⁷Ni, 40—46% ²⁷Mn and 4—18% ²⁷V. [ND]

SUB CODE: 11/ SUBM DATE: 11May64/ ATD PRESS: 4/88

Card 1/1

UDC: 669.245.018.54

L 09964-67 EMP(e)/EMT(m)/EMP(t)/ETI IJP(c) JD/HW
 ACC NR. AP6035722 SOURCE CODE: UR/0413/66/000/019/0084/0084

INVENTOR: Yelyutin, O. P.; Bokshitskiy, I. Ya.; Rogova, I. V.; Sorokin, M. N. 36

ORG: none

TITLE: High-resistivity alloy. Class 40, No. 186694 [announced by the Central Scientific Research Institute of Ferrous Metallurgy im. Bardina (Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 19, 1966, 84

TOPIC TAGS: nickel manganese alloy, high resistivity alloy, titanium containing alloy, cobalt containing alloy

ABSTRACT: This Author Certificate introduces a high-resistivity nickel-manganese- base alloy containing 45—50% nickel, 43—48% manganese, and 2—12% titanium at a nickel to manganese ratio of 1.0—1.07:1.0. A variant has 5% max titanium and 5—15% iron and/or cobalt to improve ductility.

SUB CODE: 11/ SUBM DATE: 10Aug65/ ATD PRESS: 5105

UDC: 669.018.54: :669.245'74'295

Card 1/1

ACC NR: AP7003259

(N)

SOURCE CODE: UR/0207/66/000/006/0103/0104

AUTHOR: Sorokin, M. P. (Perm'); Khlebutin, G. N. (Perm'); Shaydurov, G. F. (Perm')

ORG: none

TITLE: Stability of fluid flow between two rotating spherical surfaces

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 6, 1966, 103-104

TOPIC TAGS: fluid flow, flow stability, boundary layer flow

ABSTRACT: In 1961 it was found that the flow of liquid between two concentric spheres, the inner one in motion and the external one fixed, becomes unstable at the sphere radius ratio $r_2/r_1 = 2$ with a Reynolds number of about 100 ($R = r_1^2 \omega/v$, where ω is the angular velocity of the rotating sphere and v is kinematic viscosity of the liquid). The solution was sought in powers of the Reynolds number; since the applicability of this method when R is approximately 100 is not obvious, an experiment was set up to test the theory. A special device was constructed with an inner sphere of steel, an external sphere of organic glass, and water or commercially pure glycerine as the fluid. Very precise measurements are possible. Observations showed that there was no qualitative difference in fluid flow at all Reynolds numbers studied from the flow previously found in the second approximation. Considerably less intense motion in the meridian plane is imposed on the circular horizontal motion, i.e., on

Cord 1/2

SOROKIN, M.P.

General mechanical characteristics of mine ventilators. Prom.energ. 14
no.2:8-9 F '59. (MIRA 12:3)
(Mine ventilation--Equipment and supplies)

SOROKIN, Mikhail Petrovich; ASTAKHOV, A.V., otv.red.; LOMILINA, L.N.,
tekhn.red.

[Mine ventilation systems] Shakhtnye ventilatornye ustanovki.
Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po gornomu delu, 1960.
143 p. (MIRA 13:5)
(Mine ventilation--Equipment and supplies)
(Electricity in mining)

SOROKIN, Mikhail Petrovich; LOPATINA, G.G., red.; KARASEV, A.I.,
tekhn. red.

[Installation, operation, and repair of the electric equipment in metallurgical plants] Montazh, ekspluatatsiia i remont elektrooborudovaniia metallurgicheskikh zavodov. Moskva, Metallurgizdat, 1963. 339 p. (MIRA 16:7)
(Metallurgical plants--Electric equipment)

SOROKIN, M.P., inzh.

Measurement of the temperature of electric machinery parts. Vest.
elektroprom 34 no.6:13-15 Je '63. (MIRA 16:7)

(Electric machinery)
(Temperature--Measurement)

88634

S/170/61/004/002/013/018
B019/B060

.11.9200

AUTHOR: Sorokin, M. P.

TITLE: Experimental Study of the Stability of a Convective Flow
of a Liquid in a Long Vertical Slit

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1961, Vol. 4, No. 2,
pp. 106-108

TEXT: The experiments described here were performed on a slit whose length l-to-width d ratio was $l/d = 44$. One of the plates forming the slit was electrically heatable, while the other could be cooled with water tubes. The power of electric heating decreased linearly from bottom to top. The difference of temperature between the plates was measured with thermocouples. Three to four hours after the system was switched on there appeared a steady state, at which the wall temperature was measured. Three series of experiments were performed, at which the temperature of the cooled slit plate was kept by a thermostat at 11.5, 16.5, and 20.5°C, respectively. Fig. 2 is a graph showing the heated wall temperature

Card 1/2

Experimental Study of the Stability of a
Convective Flow of a Liquid in a Long
Vertical Slit

88634

S/170/61/004/002/013/018
B019/B060

measured in the steady state as a function of the square of the heating
current. 1970 (experimental) is obtained for the critical Grashof number,
which is near the Grashof number 1910 obtained theoretically by G. Z.
Gershuni. A turbulent flow appears above this critical value. There are
2 figures, 1 table, and 7 references: 3 Soviet and 4 British.

ASSOCIATION: Gosudarstvennyy universitet, g. Perm' (State University,
Perm')

SUBMITTED: August 13, 1960

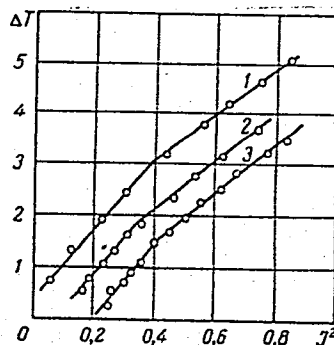


Fig. 2

Card 2/2

26.520025561
S/170/61/004/008/011/016
B125/B201

AUTHOR: Sorokin, M. P.

TITLE: Convection of a liquid in a cavity under conditions of a boundary layer

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, v. 4, no. 8, 1961, 107 - 110

TEXT: The steady motion of a liquid in a vertical slit-shaped cavity in the interval from 10^2 to 10^5 of the Grashof numbers has been studied using a device described by G. A. Ostroumov (Svobodnaya Konvektsiya v usloviyakh vnutrenney zadachi (Free convection under conditions of the internal problem), GITTL 1954). The results found by G. F. Shaydurov (ZhTF, XXVIII, no. 4, 1958) concerning convection in a spherical cavity are said to be very interesting. In the middle of a 120·120·40 mm parallelepiped made of babbitt metal, along its small axis of symmetry, a 38.6-mm large continuous slit was milled out and covered with window glass. The cavity formed in this way was filled with distilled water. A heat current perpendicular to the slit was then produced using an electric heater and a water-jet cooler. The temperatures on the walls

Card 1/5

25561

S/170/61/004/008/011/016
B125/B201

Convection of...

were measured by copper-constantan thermocouples; the temperature field inside the liquid was examined by optical methods. The optics used here differs very little from that suggested by G. A. Ostroumov. The velocity distribution was determined from the motion of light-scattering particles (aluminum powder) suspended in water by photographing the paths of the particles. The character of motion of the liquid in the slit depends largely upon the value of the Grashof number (Gr). For a small Gr, the velocity distribution is in good agreement with the theory applying to an infinite slit with isothermal walls. With rising value of Gr ($Gr > 400$) a boundary layer appears on the cavity wall, and a little mobile core in the center. The maximum of the velocity profile then approaches the cavity walls, and the temperature practically changes only near them. In this case, the velocity rises in proportion to $Gr^{1/2}$. When $Gr > 5000$, a peculiar motion occurs in the middle, as has already been described by G. F. Shaydurov (ZhTF, XXVIII, no. 4, 1958). According to Fig. 1, not only the velocity but also the temperature gradient in the middle is opposed to the corresponding quantity in the boundary layer. The undulatory motion of particles is indicative of a repeated change of the direction of vertical velocity as a function of the horizontal

Card 2/5

Convection of...

25561
S/170/61/004/008/011/016
B125/3201

coordinate. The formation of regions with a noticeable motion in a slit-shaped cavity can be explained by a vertical temperature gradient. If a certain parameter m exceeds a definite value, the profile of velocity and temperature will begin to oscillate. Theory and experiment are in good agreement; therefore, the appearance of a noticeable motion of the liquid in the middle is probably due to the vertical temperature gradient. The formulas

$$v = \frac{Gr}{4m^2M} \left[\frac{\cos my \operatorname{sh} my}{H} - \frac{\sin my \operatorname{ch} my}{S} \right], \quad (1)$$

$$T = \frac{1}{2M} \left[\frac{\sin my \operatorname{ch} my}{H} + \frac{\cos my \operatorname{sh} my}{S} \right] + Az, \quad (2)$$

$$S = \sin \frac{m}{2} \operatorname{ch} \frac{m}{2}; \quad H = \cos \frac{m}{2} \operatorname{sh} \frac{m}{2};$$

$$m = \sqrt{\frac{Gr \operatorname{Pr} A}{4}}; \quad M = \frac{H^2 + S^2}{HS}; \quad A = \frac{\partial T}{\partial z};$$

Card 3/5

25561

S/170/61/004/008/011/016 ...
B125/B201

Convection of...

used for the abovementioned theoretical calculations are also suited for calculating the stability of convective motion of a liquid in a short slit. Professor G. A. Ostroumov is thanked for having supervised the present work. There are 2 figures and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: Prager S. J. Chem. Phys., XXIII, no. 9, 1955.

ASSOCIATION: Gosudarstvennyy universitet g. Perm' (Perm' State University)

SUBMITTED: December 24, 1960

Card 4/5